

## CLAIMS

1. A method for laser welding of a first element (1) and a second element (2), in which at least said first element is of sintered material, comprising the step of focusing a laser beam (L) in proximity to the welding area (W, 6), wherein the laser welding operation is conducted with the addition of a weld material (7), characterised in that the weld material is adducted simultaneously to the welding operation and is in form of metal dusts.

2. Method as claimed in claim 1, characterised in that the dust used is a mixture of metal dusts.

3. Method as claimed in claim 1, characterised in that the grain size of the dusts ranges between 0.010 and 0.100 mm.

4. Method as claimed in claim 1, characterised in that a nozzle for the adduction of the dusts (T) is provided, separate from a nozzle (N) for the adduction of covering gas.

5. Method as claimed in claim 1, characterised in that the dusts are adducted by means of the nozzle (N) used for supplying covering gas.

6. Method as claimed in claim 1, characterised in that the angle of adduction of the dusts ranges between 15° and 75° relative to the plane of the weld area (W).

7. Method as claimed in claim 1, characterised in that the laser weld is conducted at a junction area between the first and the second element (1, 2) and that at the aforesaid junction area is provided a seat or throat for receiving the dust material.

8. Method as claimed in claim 7, characterised in that the seat or throat is formed in part in the first element (1) and in part in the second element (2) to be welded.

9. Method as claimed in claim 1, characterised in that the relative position of the axis of the laser beam (L) relative to the plane of the weld area (W) is chosen according to the materials constituting said first and second element (1, 2).

10. Method as claimed in claim 1, characterised in that the laser beam (L) is focused to a greater extent on one of said first and second element (1, 2) than on the other.

11. Method as claimed in claim 1, characterised in that the laser beam is shaped with a non circular section, such as a square or rectangular section.

12. Method as claimed in claim 1, characterised in that the laser beam is shaped by means of a dual-focus optical system with variation of the distance between the laser spots produced.

13. Method as claimed in claim 1, characterised in that a laser source chosen among CO<sub>2</sub>, Nd-YAG, High Power Laser Diode is used.

14. Device for laser -welding of a first element (1) and a second element (2), in which at least said first element is of sintered material, comprising:

- means for supporting the two elements to be welded,

- a focusing head for focusing a laser beam (L) in the weld area (W),

- means for imparting a relative motion between the focusing head (3) and the elements (1, 2) to be welded, in order to form a weld bead, and

- means for supplying a flow of metal dusts to the weld area (W, 6) during the execution of the weld.

15. Device as claimed in claim 14, characterised in that said means include a nozzle (N, T) for supplying the dusts arranged in proximity to the weld area in a fixed position relative to the focusing head.

16. Device as claimed in claim 15, characterised in that said nozzle (T) is a separate nozzle relative to a nozzle (N) used for supplying covering gas.

17. Device as claimed in claim 15, characterised  
5 in that said nozzle is also used for supplying covering gas.